The University of Calgary
Department of Mathematics and Statistics
Math 211 L60 Summer 2009 Thursday Lab (July 09, 2009)
Quiz # 1 Duration: 50 minutes
[marks] Total marks = 30

Name:_____I.D.#:_____

1. Consider the following system of linear equations where $a, b \in \mathbb{R}$:

$$\begin{cases} x + 2\,y + 3\,z = a \\ 2\,x + 3\,y + b\,z = 1 \\ -2\,x - 2\,y + 4\,z = 2\,b \end{cases}.$$

[2] (a) Write down the coefficient and augmented matrices of the system.

[6](b) Find conditions on a and b such that the system has no solution, exactly one solution or infinitely many solutions.

2. Let A be the following 3×4 matrix:

$$A = \begin{bmatrix} 1 & -2 & 0 & 5 \\ -2 & 1 & 3 & -4 \\ 3 & -5 & -1 & 13 \end{bmatrix}.$$

[6] (a) Carry the matrix A to a (not necessarily reduced) row-echelon form.

[2] (b) What is the rank of A?

[**4**] (c) Solve the following system:

$$\begin{cases} x - 2y & = & 5 \\ -2x + y + 3z & = & -4 \\ 3x - 5y - z & = & 13 \end{cases} .$$

3. [**10**] Bring the following matrix to its reduced row-echelon form:

$$\begin{bmatrix} 7 & 3 & 8 & -3 & 2 \\ 2 & 1 & 3 & -2 & -1 \\ 1 & 2 & 3 & -1 & 1 \\ -5 & 1 & -2 & 1 & 0 \end{bmatrix}.$$